## Remarks

I. Status of claims

Claims 1-12 were pending.

Claims 13-15 have been added.

Claim 11 has been amended.

II. Claim rejections under 35 U.S.C. § 103(a)

A. Claims 1 and 9, 10, and 12

The Examiner has rejected claims 1 and 9, 10, and 12 under 35 U.S.C. § 103(a) over Ohhata (US 6,304,357) in view of Paschal (US 6,462,852).

Claim 1

Claim 1 recites that a fiber optic receiver includes a substrate, a receiver optical sub-assembly (ROSA), an opto-electronic transducer, a preamplifier circuit, and a post-amplifier circuit. The opto-electronic transducer and the preamplifier circuit are incorporated within the ROSA. Both the ROSA and the post-amplifier circuit are mounted on the substrate. The inventive placement of the adjustable bandwidth amplifier outside the ROSA enables the analog electrical data signals generated by the opto-electronic transducer to be amplified and shaped properly for data recovery, while allowing the receiver to be housed within a package sized to fit within fiber optic communication devices with significant size constraints.

As explained in detail below, none of the cited references taken alone or in any permissible combination teaches or suggests the inventive fiber optic receiver now recited in claim 1.

The Examiner has asserted that Ohhata discloses:

> A fiber optic receiver, comprising: a substrate (see Ohhata, e.g., col./line:); a receiver optical sub-assembly (ROSA) mounted on the substrate (Figure 1, see Ohhata, e.g., col./line: 11/41-46, 13/60-65); an opto-electronic transducer (APD of Figure 1) incorporated within the ROSA and configured to

> generate an electrical data signal in response to a received optical data signal; a preamplifier circuit (PRE of Figure 1, see Ohhata, e.g., col./line: 6/35-40) incorporated within the ROSA, coupled to the optoelectronic transducer, and operable to linearly amplify (see Ohhata, e.g., col./line: 5/47-55) an electrical data signal generated by the opto-electronic transducer; and an adjustable bandwidth (see Ohhata Figure 14, e.g., col./line: 11/1-5) post-amplifier (PRE of Figure 1, see Ohhata, e.g., col./line: 6/38-42) mounted on the substrate and coupled to an output of the preamplifier circuit.

Contrary to the Examiner's assertion, however, Ohhata does not disclose anything about a receiver that comprises a ROSA that incorporates an opto-electronic transducer and a preamplifier circuit, much less anything about a receiver that comprises such a ROSA mounted on a substrate and an adjustable bandwidth post-amplifier circuit mounted on the same substrate, as recited in claim 1. In addition, Ohhata fails to disclose anything about a fiber optic receiver that includes an adjustable bandwidth post-amplifier circuit, as recited in claim 1.

1. Ohhata fails to teach or suggest anything about a ROSA

Ohhata does not provide any teaching or suggestion whatsoever regarding a receiver that comprises a ROSA that incorporates an opto-electronic transducer and a preamplifier circuit. In this regard, it is quite telling that the Examiner has attempted to point to locations in Ohhata where each of the elements recited in claim 1 is disclosed, except the ROSA. The Examiner has acknowledged that "Ohhata does not disclose a fiber optic connector for coupling to a mating connector of a fiber optic cable." Thus, Ohhata clearly does not disclose a ROSA that comprises such a fiber optic connector, as recited in claim 1.

Moreover, Ohhata does not even hint that the opto-electronic transducer (APD) and the preamplifier circuit (PRE) could be incorporated within a ROSA and that one of the post-amplifier circuits (AWL, AGC) could be mounted on the same substrate as the ROSA. To the contrary, Ohhata teaches that the components of his optical receiver circuit are integrated on the same semiconductor substrate (see, e.g., FIG. 12 and col. 13, lines 61-65). Thus, Ohhata teaches away from the fiber optic receiver recited in claim 1 in which the opto-electronic transducer and the pre-amplifier circuit are incorporated within the ROSA that is mounted on the same substrate as an adjustable bandwidth post-amplifier circuit.

Accordingly, one of ordinary skill in the art at the time of the invention would have been led away from the inventive fiber optic receiver recited in claim 1 based on Ohhata's teachings.

2. Ohhata fails to teach or suggest anything about an adjustable bandwidth post-amplifier circuit

The Examiner has asserted that Ohhata's optical receiver includes "an adjustable bandwidth (see Ohhata, Figure 14, e.g., col./line: 11/1-5) post-amplifier circuit (PRE of Figure 1, see Ohhata, e.g., col./line: 6/38-42)."[1] Thus, the Examiner has asserted that the PRE amplifier corresponds to the post-amplifier circuit recited in claim 1. However, the Examiner has already identified Ohhata's PRE amplifier as corresponding to the pre-amplifier circuit recited in claim 1. It is impermissible for the Examiner to rely on the same PRE amplifier in Ohhata's optical receiver to meet both the pre-amplifier circuit element recited in claim 1 and the post-amplifier circuit element recited in claim 1.

In addition, contrary to the Examiner's assertion, Ohhata's PRE amplifier is not an adjustable bandwidth amplifier. The Examiner has cited the disclosure at col. 11, lines 1-5, in support of his assertion that the PRE amplifier is an adjustable bandwidth amplifier. But this disclosure merely indicates that, when designing the optical receiver circuit shown in FIG. 12, "the bandwidth for receiving the optical signals can be widened" by reducing the input impedance Zin. This may be achieved, for example, by selecting a suitably low value for RF2 when constructing the optical receiver circuit of FIG. 12. Ohhata does not even hint that the resistor RF2 could be an adjustable resistor.

Moreover, none of the amplifiers in Ohhata's optical receiver are adjustable bandwidth amplifiers, as exemplified by the fact that there is no bandwidth adjustment component in the circuit of FIG.12 and the fact that there is no teaching or suggestion that of the amplifiers in Ohhata's optical receiver could include an input for receiving a bandwidth control signal. Thus, there is no teaching or suggestion in Ohhata that would have led one of ordinary skill in the art at the time of the invention to believe that any of the amplifiers in Ohhata's optical receiver could be adjustable bandwidth amplifiers.

[1] It is noted that FIG. 14 shows an embodiment of the AWL amplifier, not the PRE amplifier as suggested by the Examiner (see col. 10, lines 1-2: "FIG. 14 shows another embodiment of the amplifier AWL").

3. The Examiner has failed to establish a proper *prima facie* case of obviousness

The Examiner has relied on Paschal for his disclosure of "an optical connector (Figure 6a) for connecting an optical receiver to a fiber optic cable." On the basis of this disclosure, the Examiner has concluded that:

> It would have been obvious to one of ordinary skill in the art at the time of invention to connect the receiver and the optic cable via connector to facilitate easy insertion and removal of the receiver from a larger system.

In his rejection of independent claim 1, however, the Examiner has failed to find in the cited references a teaching or suggestion of all the claim limitations recited in claim 1. In particular, the Examiner has failed to point to any teaching in any of the cited references that would have led one of ordinary skill in the art to incorporate the opto-electronic transducer and the pre-amplifier circuit within a ROSA, which is mounted on the same substrate as an adjustable bandwidth post-amplifier circuit.

Simply connecting Ohhata's optical receiver to a fiber optic cable using a fiber optic connector, as proposed by the Examiner, would not lead to a fiber optic receiver in which Ohhata's opto-electronic transducer and the PRE amplifier are incorporated within a ROSA that is mounted on the same substrate as the post-amplifier circuit. As explained above, by teaching that the optical receiver is integrated on the same semiconductor chip, Ohhata teaches away from the fiber optic receiver recited in claim 1. In addition, neither Ohhata nor Paschal teaches or suggests anything about a fiber optic receiver that includes an adjustable bandwidth post-amplifier circuit. Thus, no permissible combination of Ohhata and Paschal could possibly teach or suggest such a fiber optic receiver to one of ordinary skill in the art at the time of the invention.

For at least these reasons, the Examiner has failed to establish a proper *prima* case of obviousness. Accordingly, the Examiner's rejection of independent claim 1 under 35 U.S.C. § 103(a) over Ohhata in view of Paschal should be withdrawn.

Claims 9, 10, and 12

Each of claims 9, 10, and 12 incorporates the features of independent claim 1 and therefore is patentable for at least the same reasons. Claim 9 also is patentable over Ohhata and Paschal for the following additional reasons.

Claim 9 recites that the post-amplifier comprises an input gain buffer coupled to the output of the preamplifier circuit. The Examiner has asserted that "Ohhata disclosed where output buffers could be used to extract signal to the next stage (see Ohhata, e.g., col./line: 11/37-40, 12/55-60).

At col. 11, lines 37-40, Ohhata merely discloses that the output of AGC "output may be extracted through a buffer circuit such as an emitter follower." Such a buffer, however, would not be "coupled to the output of the preamplifier circuit," as recited in claim 9. Rather, such a buffer would be connected to the output of the AGC.

At col. 12, lines 55-60, Ohhata merely discloses that "limiting amplifier AWL has a wide-band differential amplifier and an output buffer." The output buffer of the AWL amplifier, however, also is not "coupled to the output of the preamplifier circuit," as recited in claim 9. Rather, such as buffer would be connected to the output of the AWL amplifier.

B. Claims 2-5

The Examiner has rejected claims 2-5 under 35 U.S.C. § 103(a) over Ohhata in view of Paschal and North.

Each of claims 2-5 incorporates the features of independent claim 1. North does not make-up for the failure of Ohhata and Paschal to teach or suggest the fiber optic receiver recited in claim 1 in which the opto-electronic transducer and the pre-amplifier circuit are incorporated within the ROSA that is mounted on the same substrate as an adjustable bandwidth post-amplifier circuit. Accordingly, claims 2-5 are patentable over the combination of Ohhata, Paschal and North for at least the same reasons explained above. These claims also are patentable for the following additional reasons.

The Examiner has acknowledged that Ohhata and Paschal fail to teach or suggest anything about a post-amplifier circuit that comprises a switch for setting a bandwidth

response of the post-amplifier circuit in response to a received data rate control signal. The Examiner, however, has asserted that:

> North disclosed a pre-amplifier circuit that operates to adjust bandwidth response and sensitivity of a communications receiver (e.g., col./line: 4/40-55). It would have been obvious to one of ordinary skill in the art at the time of invention to apply bandwidth response settings in the post amplifier stage of Ohhata as in the pre-amp stage of North to limit bandwidth response to only that required to obtain good pulse fidelity so that less of the background noise spectrum is amplified and the input sensitivity can be kept correspondingly lower as disclosed by North (see col./line: 3/25-31). Furthermore, the principal of applying a bandwidth response modification of an amplifier stage applies no matter what stage adjustment occurs and achieves the same result.

As acknowledged by the Examiner, North does not disclose an adjustable bandwidth *post-amplifier* circuit coupled to an output of a *pre-amplifier circuit*. Instead, each of North's receiver embodiments includes an adjustable bandwidth *pre-amplifier* 210, 454 that is coupled directly to a respective opto-electronic transducer 24. In North's receiver embodiments, the switches 230 and 474 set the bandwidth response of North's *pre-amplifiers* 210 and 454, respectively; these switches do not set the bandwidth response of a *post-amplifier circuit* coupled to an output of a *pre-amplifier* circuit that is coupled to an opto-electronic transducer, as recited in claim 2. At best, one of ordinary skill in the art at the time of the invention might have been led to replace Ohhata's PRE amplifier with one of North's pre-amplifiers 210, 454. However, there is no teaching or suggestion in either reference that would have led one of ordinary skill in the art at the time of the invention to connect one of North's pre-amplifiers 210, 454 to an output of Ohhata's PRE amplifier and thereby operate as a post-amplifier for Ohhata's PRE amplifier. Thus, neither Ohhata nor North provides any motivation for the combination proposed by the Examiner. Accordingly, for this additional reason, the Examiner's rejection of claim 2 under 35 U.S.C. § 103(a) over Ohhata in view of North should be withdrawn.

The Examiner's assertion regarding the "principal of applying a bandwidth response modification" ignores a fundamental requirement of a proper rejection under 35 U.S.C. § 103: namely, that "there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the references or to combine reference teachings" (MPEP § 706.02(j)). None of the

cited references provides any motivation for the combination proposed by the Examiner. It appears that the Examiner improperly has engaged in hindsight reconstruction of the claimed invention, using applicants' disclosure as a blueprint for piecing together prior art to defeat patentability. Without a proper explanation for combining the cited prior art, the Examiner has failed to establish a proper *prima facie* case of obviousness and the rejection of claim 2 should be withdrawn. If the Examiner is aware of facts within his personal knowledge that provide the requisite factual basis and establishes the requisite motivation to support his deemed conclusion that the features recited in claim 2 would have been obvious, the Examiner is requested to provide an affidavit in accordance with 37 CFR § 1.104(d)(2). Otherwise, the Examiner is requested to desist from relying on such generalized and unsubstantiated assertions in his rejection of the claims.

Each of claims 3 and 4 incorporates the features of claim and therefore is patentable for at least the same reasons.

Claim 5 recites that the post-amplifier circuit comprises a voltage-variable capacitor. None of the cited references teaches or suggests anything that would have led one of ordinary skill in the art at the time of the invention to the fiber optic receiver recited in claim 1 in which the post-amplifier circuit comprises a voltage-variable capacitor. The Examiner has indicated that "While the voltage capacitor is not shown to be variable, these are extremely well known in the art for adjusting frequency responses in a circuit." The Examiner, however, has failed to provide the requisite factual basis and failed to establish the requisite motivation to support his deemed conclusion that the features recited in claim 5 would have been obvious to one of ordinary skill in the art at the time of the invention. In addition, the Examiner merely asserts without any support that the features recited in claim 5 are "extremely well known". The Examiner is requested to cite other art in support of his assertions. Alternatively, if the Examiner is aware of facts within his personal knowledge that provide the requisite factual basis and establishes the requisite motivation to support his deemed conclusion that the features recited in claim 5 would have been obvious, the Examiner is requested to provide an affidavit in accordance with 37 CFR § 1.104(d)(2). Otherwise, the Examiner's rejection of claim 5 should be withdrawn for this additional reason.

C. Claims 6-8

The Examiner has rejected claims 6-8 under 35 U.S.C. § 103(a) over Ohhata in view of Paschal and Lee (US 6,362,911).

Each of claims 6-8 incorporates the features of independent claim 1. Lee does not make up for the failure of Ohhata and Paschal to teach or suggest the fiber optic receiver recited in claim 1 in which the opto-electronic transducer and the pre-amplifier circuit are incorporated within the ROSA that is mounted on the same substrate as an adjustable bandwidth post-amplifier circuit. Therefore, claims 6-8 are patentable over Ohhata in view of Paschal and Lee for at least the same reasons explained above. These claims also are patentable for the following additional reasons.

Claim 6 recites that the post-amplifier circuit comprises a wide bandwidth signal path and a narrow bandwidth signal path. The Examiner has cited Lee for showing a "wide bandwidth signal (output of 12a) and low bandwidth signal (output of 12b) coupled to a multiplexer (16)." In Lee's optical receiver, however, the "wide bandwidth signal" is defined by the first pre-amplifier 12a and the "low bandwidth signal" is defined by the second pre-amplifier 12b. There is no reasonable interpretation of Lee's disclosure in which it could be said that the first and second pre-amplifiers constitute a post-amplifier circuit that is coupled to an output of a pre-amplifier circuit and comprises a wide bandwidth signal path and a narrow bandwidth signal path, as recited in claim 1.

Moreover, there is no teaching or suggestion in any of the cited references that would have led one of ordinary skill in the art to incorporate Lee's pre-amplifiers 12a, 12b into one of Ohhata's post-amplifiers (AWL, AGC), as proposed by the Examiner. Indeed, Lee's approach requires the signals from two, separate photodiodes 13a, 13b. If Lee's optical receiver were somehow incorporated into one of Ohhata's post-amplifiers, there would only be a single photodiode signal to feed into the input of one of the pre-amplifiers 12a, 12b; there would not be a second, separate photodiode signal to feed into the input of the other one of the pre-amplifiers 12a, 12b. Accordingly, one of ordinary skill in the art would not have had a reasonable expectation that the Examiner's proposed modification of Ohhata's optical receiver would be successful.

Claim 7 incorporates the features of claim 6 and therefore is patentable over Ohhata, North, and Lee for at least the same reasons explained above. In addition, the output of pre-

amplifier 12a in Lee's optical receiver is not coupled to the multiplexer 16, contrary to the Examiner's assertion. Instead, the output of pre-amplifier 12a is coupled to the positive input terminal of the limiting amplifier 18. In addition, only the wideband path in Lee's optical receiver is used to amplify the data; the low bandwidth path is used only to set a threshold voltage.

Claim 8 incorporates the features of claim 6 and therefore is patentable over Ohhata, Paschal, and Lee for at least the same reasons explained above.

D. Claim 11

The Examiner has rejected claim 11 under 35 U.S.C. § 103(a) over Ohhata in view of Paschal and Pinoow (US 4,912,525).

Claim 11 incorporates the features of independent claim 1. Pinoow does not make up for the failure of Ohhata and Paschal to teach or suggest the fiber optic receiver recited in claim 1 in which the opto-electronic transducer and the pre-amplifier circuit are incorporated within the ROSA that is mounted on the same substrate as an adjustable bandwidth post-amplifier circuit. Therefore, claim 11 is patentable over Ohhata in view of Paschal and Pinoow for at least the same reasons explained above. Claim 11 also is patentable for the following additional reasons.

Claim 11 recites that the ROSA comprises a header module mounted on the substrate and configured to house the opto-electronic transducer and the preamplifier. The Examiner has asserted that:

> The modified invention of Ohhata and Paschal as taught does not disclose a housing for the circuit. Pinoow disclosed a housing (24 of Figure 3) for an optical receiver. However, it would have been obvious to one of ordinary skill in the art at the time of invention to use a housing for the circuit to protect it from environmental degradation. Furthermore, it is extremely well known in the art to provide housing for electronics.

With this rejection, the Examiner has mischaracterized the language of claim 11, which recites that the header module houses the opto-electronic transducer and the pre-amplifier circuit. In addition, contrary to the Examiner's assertion, Pinoow's photodetector housing 24 only contains a photodetector 28 (col. 3, lines 27-30); the photodetector housing

24 does not house an opto-electronic transducer and a pre-amplifier circuit, as recited in claim 11. Accordingly, none of the cited references teaches or suggests a ROSA header module that houses the opto-electronic transducer and the preamplifier, as recited in claim 11. Therefore, no permissible combination of Ohhata, Paschal and Pinoow could possibly teach or suggest the invention fiber optic receiver recited in claim 11.

Thus, the Examiner has failed to provide the requisite factual basis and failed to establish the requisite motivation to support his deemed conclusion that the features recited in claim 11 would have been obvious to one of ordinary skill in the art at the time of the invention. The Examiner merely asserts without any basis that the features recited in claim 11 are "extremely well known." The Examiner is requested to cite other art in support of his assertions. Alternatively, if the Examiner is aware of facts within his personal knowledge that provide the requisite factual basis and establishes the requisite motivation to support his deemed conclusion that the features recited in claim 11 would have been obvious, the Examiner is requested to provide an affidavit in accordance with 37 CFR § 1.104(d)(2). Otherwise, the Examiner's rejection of claim 11 should be withdrawn.

## IV. Conclusion

For the reasons explained above, all of the pending claims are now in condition for allowance and should be allowed.

Charge any excess fees or apply any credits to Deposit Account No. 50-1078.

Respectfully submitted,

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